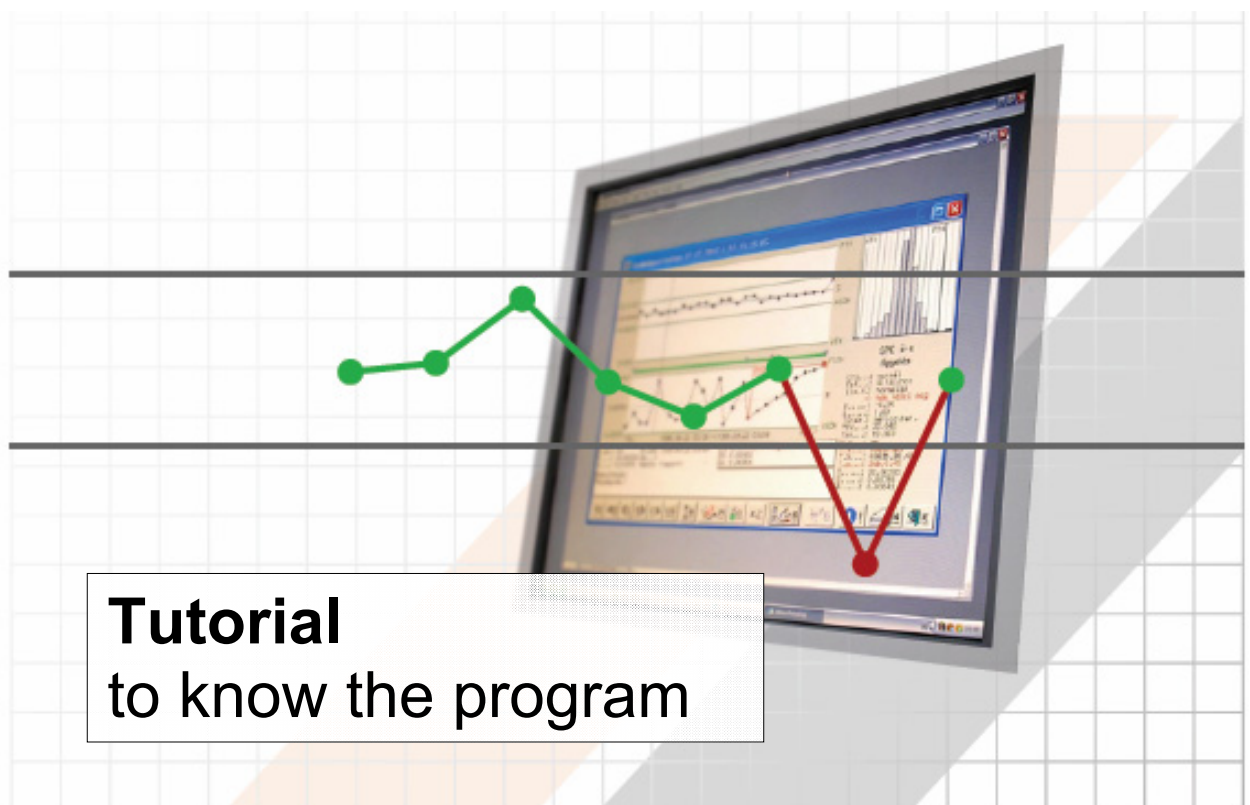


HNS SPC^{ea}

Statistical process and quality control





Tutorial to know the program

2009 September 25

HNS SPC^{ea}

Statistical process and quality control

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Contents

1 Content of the tutorial	2
2 Installation of the required environment.....	3
2.1 Installation of the program	3
2.2 Creating the pictures to be displayed.....	3
2.3 Connecting the gauges	3
2.4 Starting the program	3
3 Settings.....	4
3.1 Shift settings.....	4
3.2 Users.....	4
4 Building the database	7
4.1 Adding the product.....	7
4.2 Adding the parameters.....	7
4.3 Creating the machine list	12
5 Measuring.....	14
5.1 Measuring the total length	14
5.2 Measuring the head length	18
5.3 Measuring the head diameter	21
5.4 Measuring the stalk diameter	24
6 Analysis	27
6.1 Select the data	27
6.2 Value chart	28
6.3 Histogram.....	28
6.4 Control chart	29
6.5 Process overview	30
6.6 Product pareto analysis	30
7 Exit from the program	31

1 Content of the tutorial

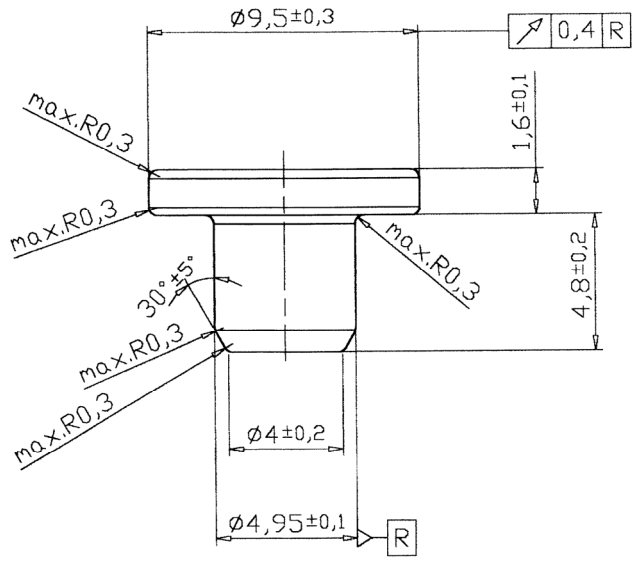
This tutorial presents

- ➔ creating the database needed to the measuring of the part,
- ➔ measuring the parameters prescribed in the control plan,
- ➔ analysing the recorded data,

step by step, by the example of the steel rivet, which can be seen in the following picture.

The tutorial contains the preparations required to make the steps above (for example installation of the measuring workplace).

Further knowledge about the several functions can be found in the user's manual of the program.

CONTROL PLAN					
Part's name: Steel rivet			Operation: Final inspection		
Drawing nr.: S 49548-T		Material: QSt 36-2		Weight: 1,6 gr / pc	
					
Nr.	Parameter	Specification	Based on	Gauge	Sampling frequency
1.	Total length	6,4 ± 0,3	Drawing	Caliper	5 pcs/4 hours
2.	Head length	1,6 ± 0,1	Drawing	Caliper	5 pcs/4 hours
3.	Head diameter	Ø 9,5 ± 0,3	Drawing	Micrometer	5 pcs/4 hours
4.	Stalk diameter	Ø 4,95 ± 0,1	Drawing	Micrometer	5 pcs/4 hours

The product is produced on two turning-machines - one with the ID A-11 and the other with the ID A-12.

2 Installation of the required environment

2.1 Installation of the program

See the chapter 1.3 *Installation of the program* in the *User's manual*.

2.2 Creating the pictures to be displayed

The BMP files, which are in the *Tutorials\Pictures* directory of the installation CD, should be copied into an optional directory (the pictures can be downloaded from the page www.hns.eu/spc, too). *C:\Tutorial\Pictures* directory is used to store the pictures in this example. In case of using another directory, the actual path of the pictures should be selected in the *Image* field at creating the product and the parameters - contrary to the path in the screen-images in this tutorial.

2.3 Connecting the gauges

Required equipment:

- HNS SMUX-4 / HNS USBMUX-4 (MITUTOYO Digimatic-compatible interface),
- Mitutoyo Digimatic caliper (type: 500-161U),
- Mitutoyo Digimatic connecting cable for the caliper (type: 959149, 959150),
- Mitutoyo Digimatic micrometer (type: 293-521-30),
- Mitutoyo Digimatic connecting cable for the micrometer (type: 937387).

Steps of the connection of the gauges:

- connecting the HNS SMUX-4 interface to the COM1 serial port of the computer, or connecting the HNS USBMUX-4 interface to one of the USB ports of the computer (this interface requires to install a driver program - if it has not been installed yet -, see the chapter 1.3.1 *Installation of the interface* in the *User's manual*)
- connecting the connecting cable (959150 or 959149) into the data output of the caliper („ABSOLUTE” DIGIMATIC caliper / 500-161U),
- connecting the connecting cable to the CH0 channel of HNS SMUX-4 / HNS USBMUX-4 interface,
- connecting the connecting cable (937387) into the data output of the micrometer (DIGIMATIC micrometer 0-25 mm / 293-521-30),
- connecting the connecting cable to the CH1 channel of HNS SMUX-4 / HNS USBMUX-4 interface,
- switching on and testing the gauges.

2.4 Starting the program

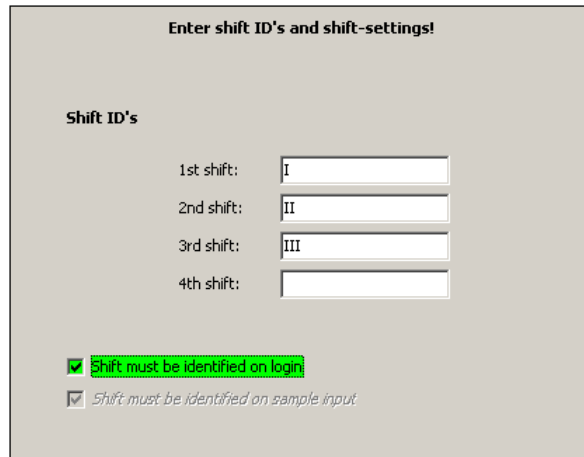
See the chapter 2.2 *Starting the program* in the *User's manual*.

3 Settings

3.1 Shift settings

Choose the **Settings** menu item of the main menu, and then the **Shifts** menu item of the sub-menu.

Give the shift identifiers to be used, and switch on the **Shift must be indentified on login** switch in the displayed window.



Enter shift ID's and shift-settings!

Shift ID's

1st shift: I

2nd shift: II

3rd shift: III

4th shift:

☒ Shift must be identified on login

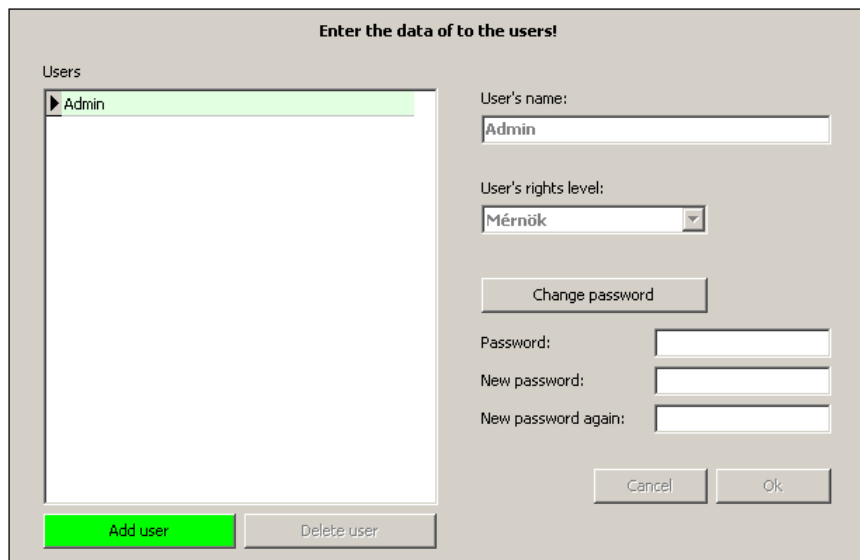
☐ Shift must be identified on sample input

Exit from the **Settings** menu with the  button, which is the last button of the sub-menu.

3.2 Users

Choose the **Users** menu item of the main menu.

Press the **Add user** button in the displayed window.



Enter the data of to the users!

Users

Admin

User's name: Admin

User's rights level: Mérnök

Change password

Password:

New password:

New password again:

Add user Delete user

Cancel Ok

Add yourself to the users on engineer rights level, and then press the **Ok** button. Yours password should be *spc*.

Enter the data of to the users!

Users

Admin
*xy

User's name:

User's rights level:

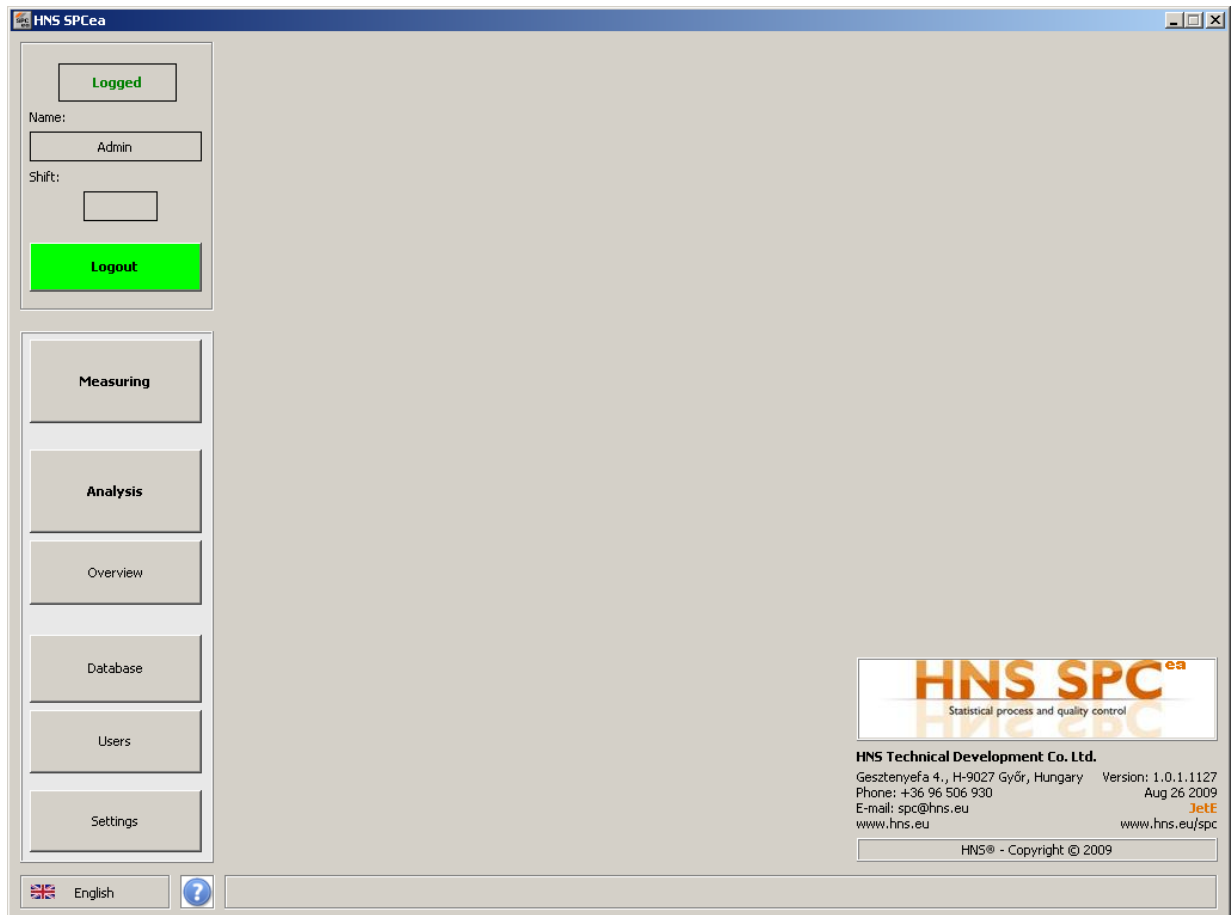
Password:

New password:

New password again:

Exit from the **Users** menu with the  button, which is the last button of the sub-menu.

Logout from the program with the **Logout** button.



The main interface of the HNS SPCea software. On the left is a sidebar menu with buttons: Logged, Name: (text field with 'Admin'), Shift: (text field), Logout, Measuring, Analysis, Overview, Database, Users, and Settings. The main area is a large empty space. At the bottom right, there is a logo for HNS SPCea and contact information for HNS Technical Development Co. Ltd. The bottom status bar shows a language selector (English) and a help icon.

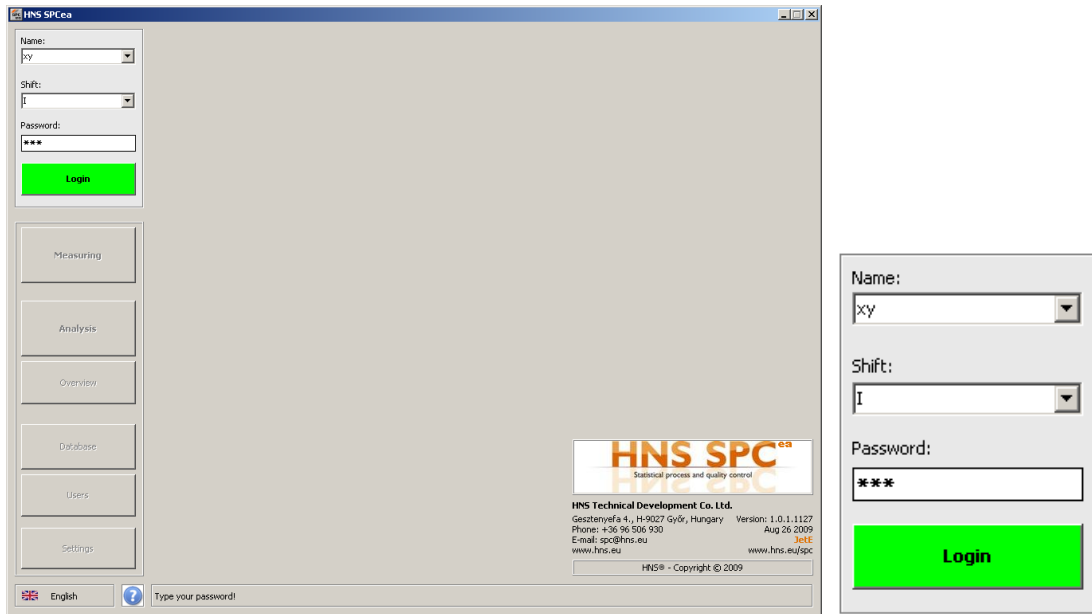
Log into the program as the user added before.

Give the user's name, the identifier of the current shift and the password, and then press the **Login** button.

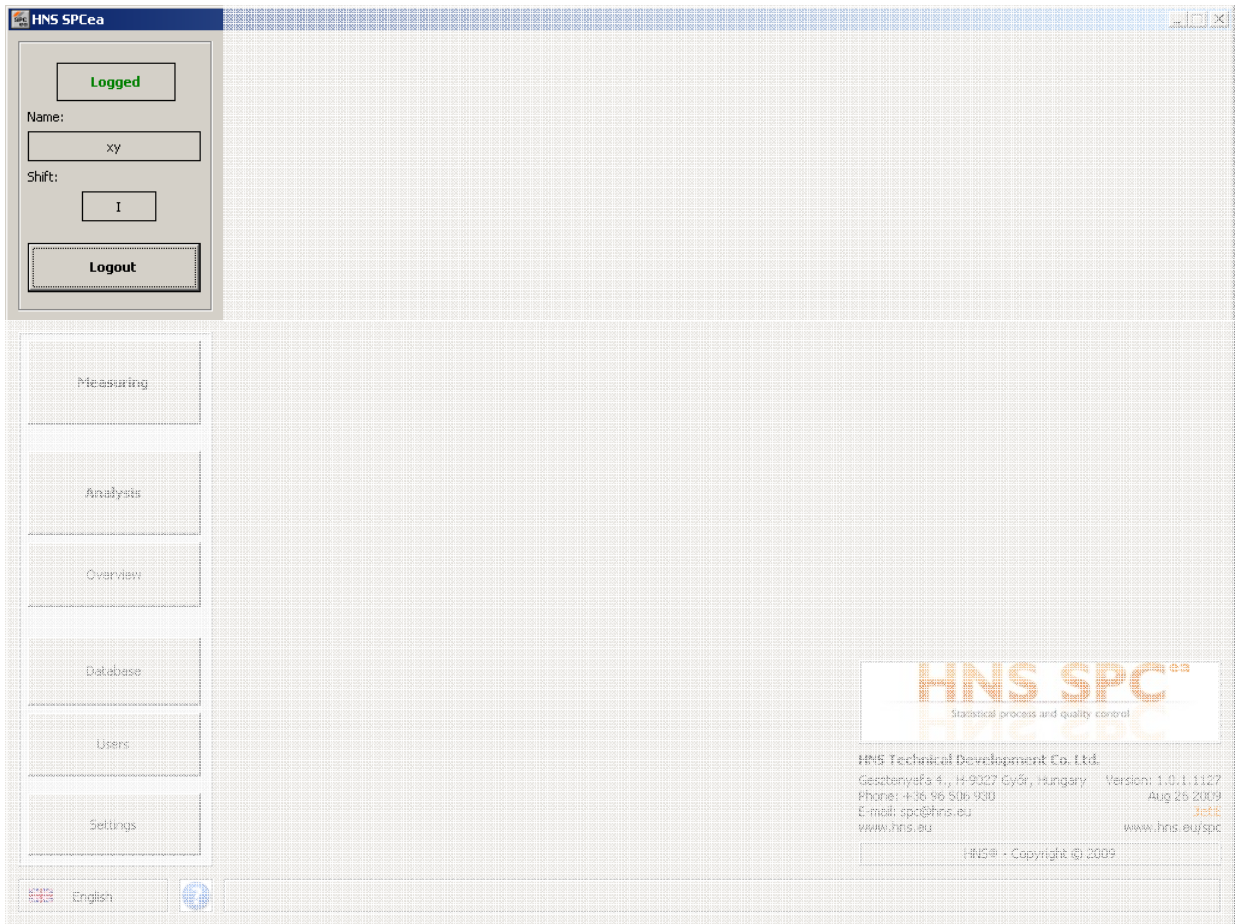
Note

The user's name can be selected out of the users occurred in the user registration.

The shift ID can be selected out of the values given in the shift settings menu item.



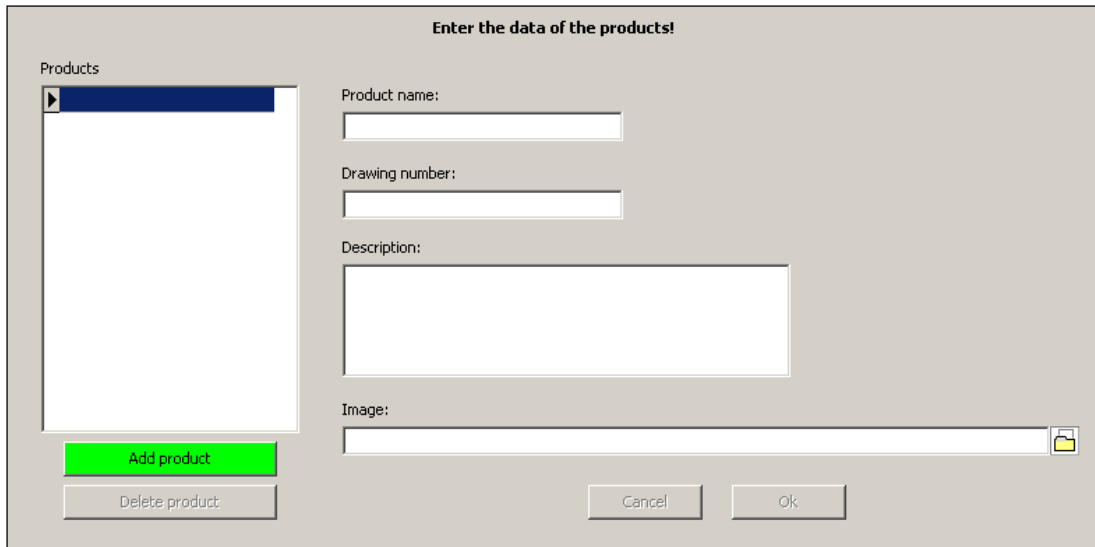
After the successful login, following user and shift data are displayed in the left-upper section of the window.



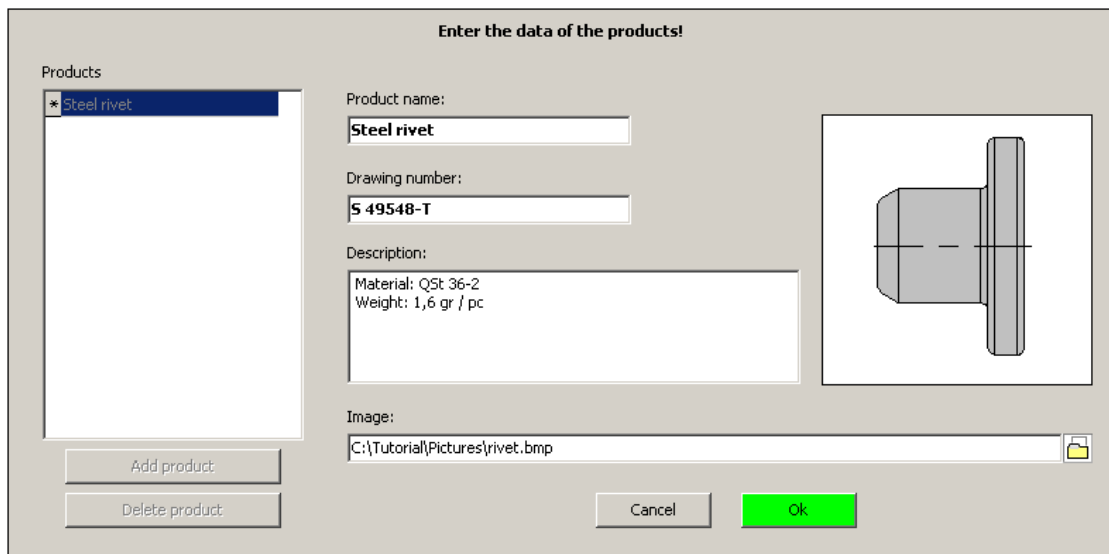
4 Building the database

4.1 Adding the product

Choose the **Database** menu item of the main menu, and then the **Products** menu item of the sub-menu. Press the **Add product** button in the displayed window.



Enter the product's data and press the **Ok** button.



4.2 Adding the parameters

Choose the **Database** menu item of the main menu, and then the **Parameters** menu item of the sub-menu. Select the *Steel rivet* product in the **Product** field, and then press the **Add parameter** button, in the displayed window.

Attention!

The number of the port used for connecting the gauge (interface) on the given computer actually has to be selected in the port field.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

Parameter name:

Unit:

Specification: #

USL #

LSL #

Sample size: *

Chart size:

Decimals:

Kind of chart: *

Gauge:

Type of chart:

Port:

Control limits:

Channel:

UCL x R/s

LCL x R/s

Required capability:

Image:

Add parameter

Delete parameter

Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!

Give the data of the first, *Total length* parameter, and then press the **Ok** button.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

* **Total length**

Parameter name: **Total length**

Unit: **mm**

Specification: # **double sided**

USL # **6,7**

LSL # **6,1**

Sample size: * **5**

Chart size: **25**

Decimals: **2 [0,01]**

Kind of chart: * **x-s**

Gauge: **HNS SMUX (Digimatic)**

Type of chart: **monitoring**

Port: **COM1**

Control limits: **calculated**

Channel: **0**

UCL x R/s

LCL x R/s

Required capability: **1,33**

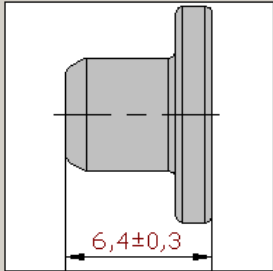
Image: **C:\Tutorial\Pictures\total_length.bmp**

Add parameter

Delete parameter

Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!



Press the **Add parameter** button again.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters: **Total length**

Parameter name: **Total length**

Unit: **mm**

Specification: **# double sided**

USL: **# 6,7**

LSL: **# 6,1**

Sample size: *** 5**

Decimals: **2 [0,01]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **0**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\total_length.bmp**

Chart size: **25**

Kind of chart: *** x-s**

Type of chart: **monitoring**

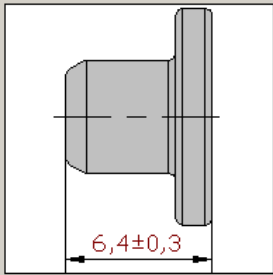
Control limits: **calculated**

UCL: **x---** R/s: **---**

LCL: **x---** R/s: **---**

Add parameter **Delete parameter** **Cancel** **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!



Give the data of the second, *Head length* parameter, and then press the **Ok** button.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters: **Total length**
*** Head length**

Parameter name: **Head length**

Unit: **mm**

Specification: **# double sided**

USL: **# 1,7**

LSL: **# 1,5**

Sample size: *** 5**

Decimals: **2 [0,01]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **0**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\head_length.bmp**

Chart size: **25**

Kind of chart: *** x-s**

Type of chart: **monitoring**

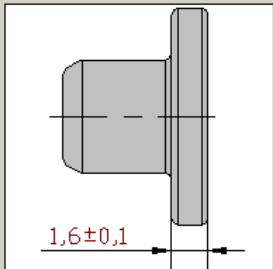
Control limits: **calculated**

UCL: **x---** R/s: **---**

LCL: **x---** R/s: **---**

Add parameter **Delete parameter** **Cancel** **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!



Press the **Add parameter** button again.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

- Total length
- Head length

Parameter name: **Head length**

Unit: **mm**

Specification: # **double sided**

USL # **1,7**

LSL # **1,5**

Sample size: * **5**

Decimals: **2 [0,01]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **0**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\head_length.bmp**

Chart size: **25**

Kind of chart: * **x-s**

Type of chart: **monitoring**

Control limits: **calculated**

UCL x --- R/s ---

LCL x --- R/s ---

Add parameter

Delete parameter

Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!

Give the data of the third, **Head diameter** parameter, and then press the **Ok** button.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

- Total length
- Head length
- * Head diameter

Parameter name: **Head diameter**

Unit: **mm**

Specification: # **double sided**

USL # **9,8**

LSL # **9,2**

Sample size: * **5**

Decimals: **3 [0,001]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **1**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\head_diameter.bmp**

Chart size: **25**

Kind of chart: * **x-s**

Type of chart: **monitoring**

Control limits: **calculated**

UCL x --- R/s ---

LCL x --- R/s ---

Add parameter

Delete parameter

Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!

Press the **Add parameter** button again.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

- Total length
- Head length
- Head diameter

Parameter name: **Head diameter**

Unit: **mm**

Specification: **# double sided**

USL **# 9,8**

LSL **# 9,2**

Sample size: *** 5**

Chart size: **25**

Decimals: **3 [0,001]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **1**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\head_diameter.bmp**

Kind of chart: *** x-s**

Type of chart: **monitoring**

Control limits: **calculated**

UCL x --- R/s ---

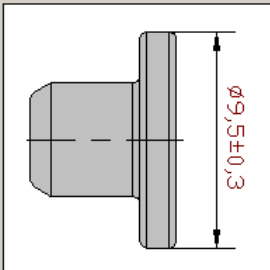
LCL x --- R/s ---

Add parameter

Delete parameter

Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!



Give the data of the fourth, *Stalk diameter* parameter, and then press the **Ok** button.

Enter the data of the parameters!

Product: **Steel rivet**

Parameters:

- Total length
- Head length
- Head diameter
- * Stalk diameter

Parameter name: **Stalk diameter**

Unit: **mm**

Specification: **# double sided**

USL **# 5,05**

LSL **# 4,85**

Sample size: *** 5**

Chart size: **25**

Decimals: **3 [0,001]**

Gauge: **HNS SMUX (Digimatic)**

Port: **COM1**

Channel: **1**

Required capability: **1,33**

Image: **C:\Tutorial\Pictures\stalk_diameter.bmp**

Kind of chart: *** x-s**

Type of chart: **monitoring**

Control limits: **calculated**

UCL x --- R/s ---

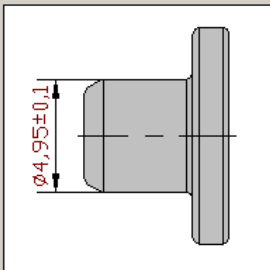
LCL x --- R/s ---

Add parameter

Delete parameter

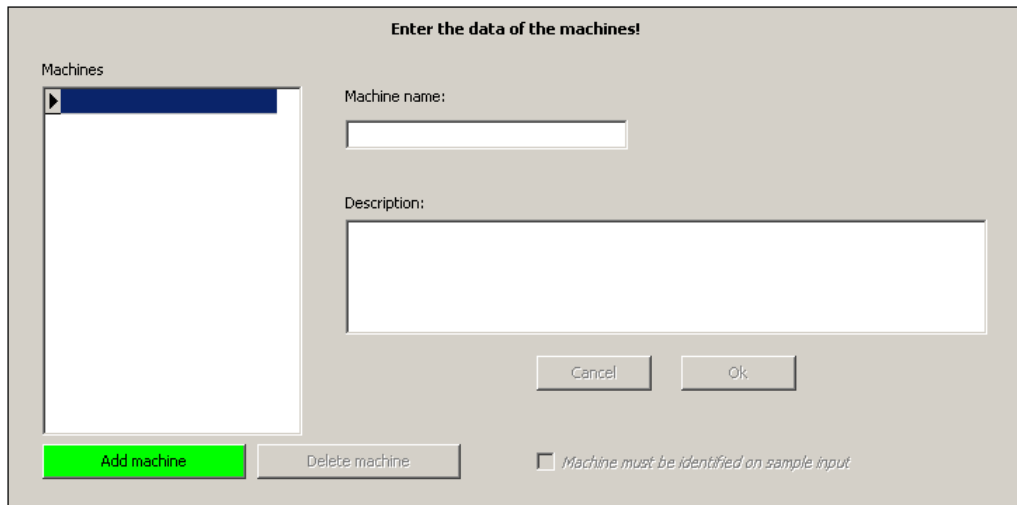
Cancel **Ok**

ATTENTION! #: when the specification is changed, the statuses of the data stored in the database are re-evaluated, therefore the process may take up more minutes depending on the number of the measured values.
*: sample size and kind of chart cannot be changed later!



4.3 Creating the machine list

Choose the **Database** menu item of the main menu, and then the **Machines** menu item of the sub-menu. Press the **Add machine** button, in the displayed window.



Enter the data of the machines!

Machines

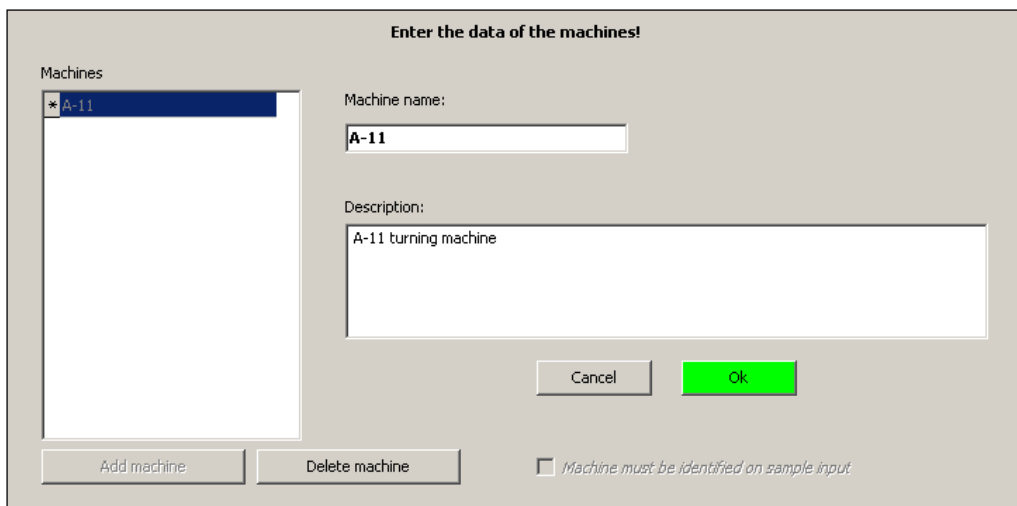
Machine name:

Description:

Cancel Ok

Add machine Delete machine ☐ Machine must be identified on sample input

Give the data of the first machine, and then press the **Ok** button.



Enter the data of the machines!

Machines

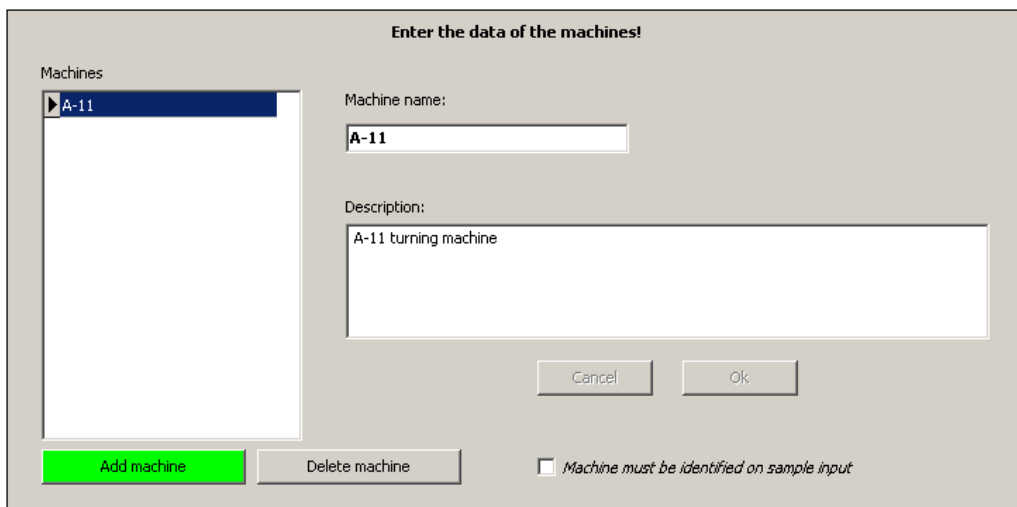
Machine name:

Description:

Cancel Ok

Add machine Delete machine ☐ Machine must be identified on sample input

Press the **Add machine** button again.



Enter the data of the machines!

Machines

Machine name:

Description:

Cancel Ok

Add machine Delete machine ☐ Machine must be identified on sample input

Give the data of the second machine, and then press the **Ok** button.

Enter the data of the machines!

Machines

- A-11
- * A-12

Machine name:

A-12

Description:

A-12 turning machine

Cancel Ok

Add machine Delete machine ☐ Machine must be identified on sample input

Switch on the **Machine must be identified on sample input** switch.

Enter the data of the machines!

Machines

- A-11
- ▶ A-12

Machine name:

A-12

Description:

A-12 turning machine

Cancel Ok

Add machine Delete machine ☒ Machine must be identified on sample input

5 Measuring

Choose the **Measuring** menu item of the main menu. Select the *Steel rivet* product, and then press the **Next** button, in the displayed window.

Select product to measure!

Name	Drawing number
▶ Steel rivet	S 49548-T

Up

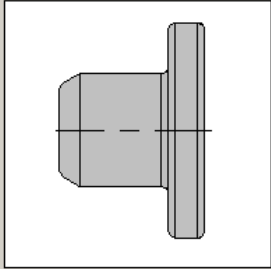
Down

Description:

Material: QSt 36-2
Weight: 1,6 gr / pc

Cancel

Next



5.1 Measuring the total length

Select the *Total length* parameter, and then press the **Next** button, in the displayed window.

Select parameter to measure!

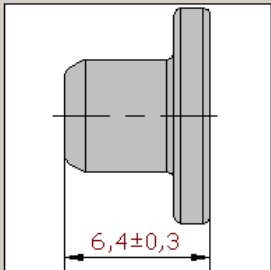
Name	Unit	Sample size
Head diameter	mm	5
Head length	mm	5
Stalk diameter	mm	5
▶ Total length	mm	5

Up

Down

Previous

Next



Enter the identifiers to record with the sample, and then press the **Next** button, in the displayed window.

Note

Sampling time and Shift fields are filled in automatically (the shift identifier is the value given at the login).

Machine ID can be selected out of the machines recorded in the database.

Optional value can be entered as LOT ID.

Enter the sample data!

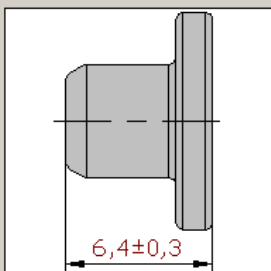
Sampling time: 2009.08.13. 13:22:39	Machine: A-11 A-11 A-12	LOT: 123456-00
Shift: I II III	Up Down	Up Down

Measure the total length of the first part with the caliper, and then press the **Measure** button.

Comment

If the gauge is off, program will display an error message about it. After turning on the gauge, the **Switch on the gauge** button has to be pressed to check the gauge again.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product Name: Steel rivet Drawing number: 5 49548-T	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No.</th> <th>Measured value</th> </tr> </thead> <tbody> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td></td></tr> </tbody> </table>	No.	Measured value	1		2		3		4		5		6,57 USL LSL Measure [F12]	 6,4±0,3 Up Down Save data
No.	Measured value														
1															
2															
3															
4															
5															

Measure the specified five pieces in all in the same way, and then press the **Save data** button if measured values are not wanted to modify.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product	
Name:	Steel rivet
Drawing number:	5 49548-T

Parameter	
Name:	Total length
Unit:	mm
Specification:	LSL: 6.10 USL: 6.70
Gauge:	HNS SMUX (Digimatic)
port	COM1
channel	0

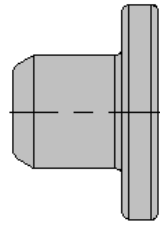
No.	Measured value
1	6,57
2	6,64
3	6,31
4	6,44
5	6,47

6,47

USL

LSL

Measure [F12]



Up

Down

Save data

Previous

Next

Press the **Next** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product	
Name:	Steel rivet
Drawing number:	5 49548-T

Parameter	
Name:	Total length
Unit:	mm
Specification:	LSL: 6.10 USL: 6.70
Gauge:	HNS SMUX (Digimatic)
port	COM1
channel	0

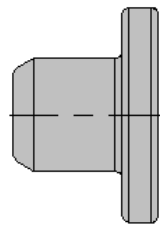
No.	Measured value
1	6,57
2	6,64
3	6,31
4	6,44
5	6,47

6,47

USL

LSL

Measure [F12]



Up

Down

Save data

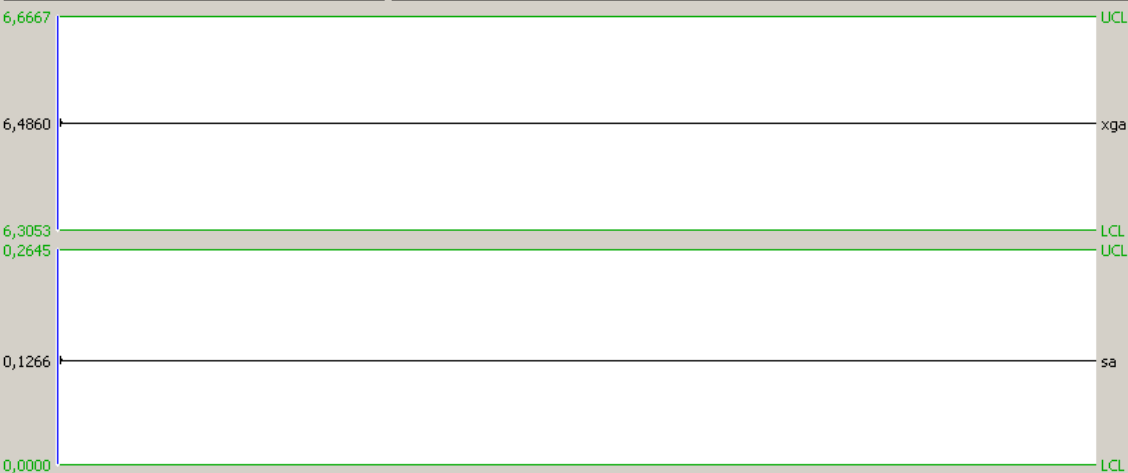
Previous

Next

The control chart of the *Total length* parameter will be displayed, this window can be closed with the **Next** button.

Check the control chart! xa-s [monitoring]

Product Name: Steel rivet Drawing number: S 49548-T	Parameter Name: Total length Specification: double sided Unit: mm USL: 6,7 Control limits: calculated LSL: 6,1
--	---



Sample	Sample time: 2009.08.13. 13:27:09 Measured by: xy Machine: A-11 LOT: 123456-00	Shift: I Average: 6,4860 Deviation: 0,1266	Process	Grand average: 6,4860 Deviation average: 0,1266 Sigma: 0,1347	Oos' upper: 0pcs Oos' lower: 0pcs Cp: 0,74 Cpk: 0,53
---------------	---	---	----------------	--	---

◀ Previous
⏮
⏪
⏩
[1] 1
⏮
⏪
⏩
+
-
⏮
⏩
Next ▶

Press the **Measure sample of another parameter** button, in the displayed window.

◀ Measure sample of another product
◀ Measure sample of another parameter
◀ Measure next sample with other sample data
◀ Measure next sample with the same sample data

◀ Previous
Exit ▶

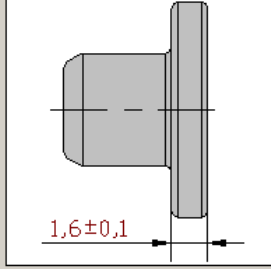
5.2 Measuring the head length

Select the *Head length* parameter, and then press the **Next** button, in the displayed window.

Select parameter to measure!

Name	Unit	Sample size
Head diameter	mm	5
Head length	mm	5
Stalk diameter	mm	5
Total length	mm	5

Up
Down



Previous Next

Enter the identifiers to record with the sample - likewise for the *Total length* -, and then press the **Next** button, in the displayed window.

Enter the sample data!

Sampling time: 2009.08.13. 13:45:43

Machine: A-11
A-12

LOT: 123456-00
123456-00

Shift: I
II
III

Up
Down

Previous Next

Measure the head length of the first part with the caliper, and then press the **Measure** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product

Name: Steel rivet

Drawing number: 5 49548-T

Parameter

Name: Head length

Unit: mm

Specification: LSL: 1.50 USL: 1.70

Gauge: HNS SMUX (Digimatic)

port: COM1

channel: 0

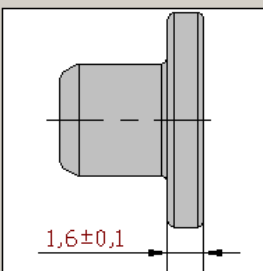
No.	Measured value
1	
2	
3	
4	
5	

1,58

USL

LSL

Measure [F12]



Up
Down

Save data

Next

Previous

Measure the specified five pieces in all in the same way, and then press the **Save data** button if measured values are not wanted to modify.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

No.	Measured value
1	1,58
2	1,65
3	1,62
4	1,67
5	1,58

Product
 Name:
 Drawing number:

Parameter
 Name:
 Unit:
 Specification:
 Gauge:
 port:
 channel:

1,58
USL
LSL
Measure [F12]

Up
Down

Save data

Previous Next

Press the **Next** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

No.	Measured value
1	1,58
2	1,65
3	1,62
4	1,67
5	1,58

Product
 Name:
 Drawing number:

Parameter
 Name:
 Unit:
 Specification:
 Gauge:
 port:
 channel:

1,58
USL
LSL
Measure [F12]

Up
Down

Save data

Previous **Next**

The control chart of the *Head length* parameter will be displayed, this window can be closed with the **Next** button.

Check the control chart!

Product

Name:

Drawing number:

Parameter

Name: Specification:

Unit: USL:

Control limits: LSL:

1,6780 UCL

1,6200 xga

1,5620 LCL

0,0849 UCL

0,0406 sa

0,0000 LCL

Sample

Sample time:

Measured by:

Machine:

LOT:

Shift:

Average:

Deviation:

Process

Grand average:

Deviation average:

Sigma:

OoS' upper:

OoS' lower:

Cp:

Cpk:

Previous

[1] 1

Next

Press the **Measure sample of another parameter** button, in the displayed window.

Measure sample of another product

Measure sample of another parameter

Measure next sample with other sample data

Measure next sample with the same sample data

Previous

Exit

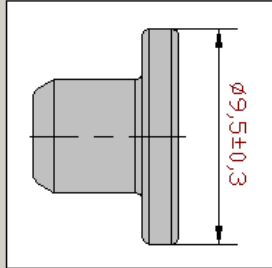
5.3 Measuring the head diameter

Select the *Head diameter* parameter, and then press the **Next** button, in the displayed window.

Select parameter to measure!

Name	Unit	Sample size
▶ Head diameter	mm	5
Head length	mm	5
Stalk diameter	mm	5
Total length	mm	5

Up
Down



Previous Next

Enter the identifiers to record with the sample - likewise for the *Total length* -, and then press the **Next** button, in the displayed window.

Enter the sample data!

Sampling time: 2009.08.13. 14:01:44

Machine: A-11
A-12

LOT: 123456-00
123456-00

Shift: I
II
III

Up
Down

Previous Next

Measure the head diameter of the first part with the micrometer, and then press the **Measure** button.

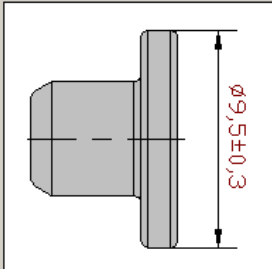
Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product
Name: Steel rivet
Drawing number: 5.49548-T

Parameter
Name: Head diameter
Unit: mm
Specification: LSL: 9.200 USL: 9.800
Gauge: HNS SMUX (Digimatic)
port: COM1
channel: 1

No.	Measured value
▶ 1	
2	
3	
4	
5	

9,805
USL
LSL
Measure [F12]



Up
Down
Save data

Previous Next

Measure the specified five pieces in all in the same way, and then press the **Save data** button if measured values are not wanted to modify.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

No.	Measured value
1	9,805
2	9,684
3	9,725
4	9,601
5	9,663

Product Name: **Steel rivet**
Drawing number: **5 49548-T**

Parameter Name: **Head diameter**
Unit: **mm**
Specification: **LSL: 9.200 USL: 9.800**
Gauge: **HNS SMUX (Digimatic)**
port: **COM1**
channel: **1**

9,663
USL
LSL
Measure [F12]

Up
Down

Save data

Previous Next

Press the **Next** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

No.	Measured value
1	9,805
2	9,684
3	9,725
4	9,601
5	9,663

Product Name: **Steel rivet**
Drawing number: **5 49548-T**

Parameter Name: **Head diameter**
Unit: **mm**
Specification: **LSL: 9.200 USL: 9.800**
Gauge: **HNS SMUX (Digimatic)**
port: **COM1**
channel: **1**

9,663
USL
LSL
Measure [F12]

Up
Down

Save data

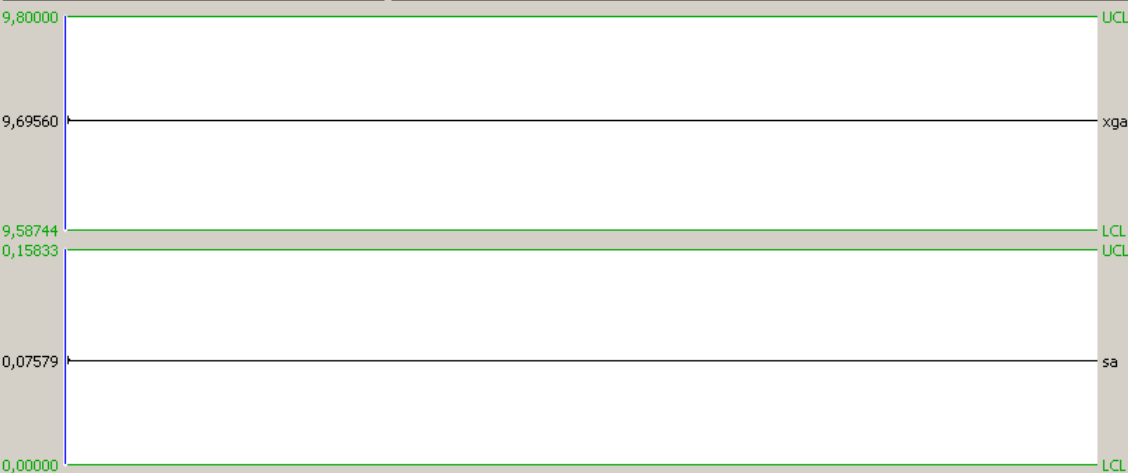
Previous **Next**

The control chart of the *Head diameter* parameter will be displayed, this window can be closed with the **Next** button.

Check the control chart!
xa-s [monitoring]

Product
 Name:
 Drawing number:

Parameter Name: Specification:
 Unit: USL:
 Control limits: LSL:



Sample
 Sample time:
 Measured by:
 Machine:
 LOT:

Process
 Shift:
 Average:
 Deviation:

Grand average: OoS' upper:
 Deviation average: OoS' lower:
 Sigma: Cp:
 Cpk:

Press the **Measure sample of another parameter** button, in the displayed window.

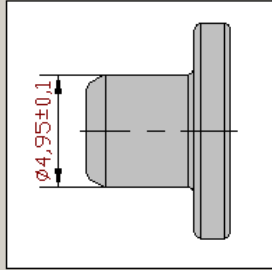
5.4 Measuring the stalk diameter

Select the *Stalk diameter* parameter, and then press the **Next** button, in the displayed window.

Select parameter to measure!

Name	Unit	Sample size
Head diameter	mm	5
Head length	mm	5
▶ Stalk diameter	mm	5
Total length	mm	5

Up
Down



Previous Next

Enter the identifiers to record with the sample - likewise for the *Total length* -, and then press the **Next** button, in the displayed window.

Enter the sample data!

Sampling time: 2009.08.13. 14:44:44 Machine: A-11
Shift: I A-12 LOT: 123456-00

Up
Down Up
Down Up
Down

Previous Next

Measure the stalk diameter of the first part with the micrometer, and then press the **Measure** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product

Name: Steel rivet

Drawing number: 5 49548-T

Parameter

Name: Stalk diameter

Unit: mm

Specification: LSL: 4.850 USL: 5.050

Gauge: HNS SMUX (Digimatic)

port: COM1

channel: 1

No.	Measured value
1	
2	
3	
4	
5	

4,914

USL

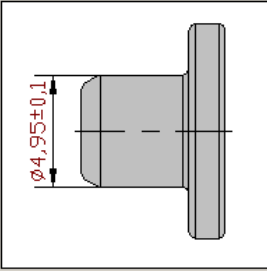
LSL

Measure [F12]

Up
Down

Save data

Next



Previous Next

Measure the specified five pieces in all in the same way, and then press the **Save data** button if measured values are not wanted to modify.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product	
Name:	Steel rivet
Drawing number:	5 49548-T

Parameter	
Name:	Stalk diameter
Unit:	mm
Specification:	LSL: 4.850 USL: 5.050
Gauge:	HNS SMUX (Digimatic)
port	COM1
channel	1

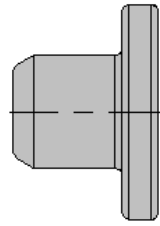
No.	Measured value
1	4,914
2	4,909
3	4,956
4	4,938
5	4,994

4,994

USL

LSL

Measure [F12]



Up

Down

Save data

Previous

Next

Press the **Next** button.

Measure the pieces of the sample and input measured values by keyboard or by gauge directly!

Product	
Name:	Steel rivet
Drawing number:	5 49548-T

Parameter	
Name:	Stalk diameter
Unit:	mm
Specification:	LSL: 4.850 USL: 5.050
Gauge:	HNS SMUX (Digimatic)
port	COM1
channel	1

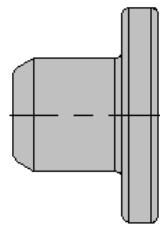
No.	Measured value
1	4,914
2	4,909
3	4,956
4	4,938
5	4,994

4,991

USL

LSL

Measure [F12]



Up

Down

Save data

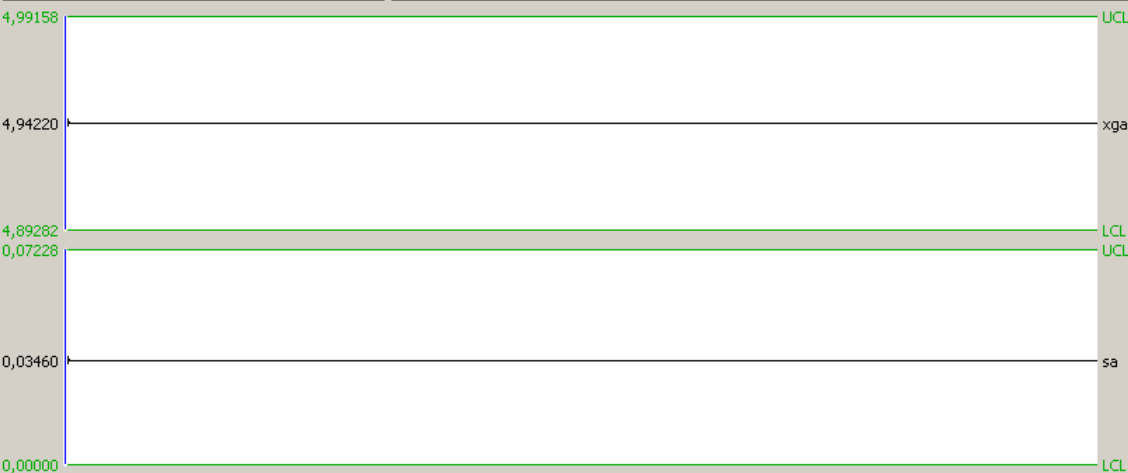
Previous

Next

The control chart of the *Stalk diameter* parameter will be displayed, this window can be closed with the **Next** button.

Check the control chart! xa-s [monitoring]

Product Name: Steel rivet Drawing number: S 49548-T	Parameter Name: Stalk diameter Specification: double sided Unit: mm USL: 5,05 Control limits: calculated LSL: 4,85
--	---



Sample	Sample time: 2009.08.13. 14:44:44	Shift: I	Process	Grand average: 4,94220	OoS' upper: 0pcs
	Measured by: xy	Average: 4,94220		Deviation average: 0,03460	OoS' lower: 0pcs
	Machine: A-11			Sigma: 0,03681	Cp: 0,91
	LOT: 123456-00	Deviation: 0,03460			Cpk: 0,83

◀ Previous
⏮
⏪
⏩
[1] 1
⏭
⏮
⏪
⏩
+
-
⏭
⏮
⏪
⏩
⏭
Next ▶

All of the parameters specified in the control plan have been measured, so go back into the main window with the **Exit** button.

◀ Measure sample of another product
◀ Measure sample of another parameter
◀ Measure next sample with other sample data
◀ Measure next sample with the same sample data

◀ Previous
Exit ▶

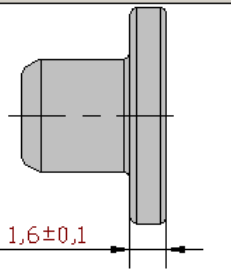
6 Analysis

6.1 Select the data

Choose the **Analysis** menu item of the main menu, and then the **Select data** menu item of the sub-menu.

Select the product and parameter to be analysed, in the displayed window. After this, select the sample range to be analysed, this can be the samples of the last control chart or the samples recorded during an optional time range, sorted by sample identifiers optionally.

Select sample range to analyse!

Product: Steel rivet	Drawing number: S 49548-T Description: Material: QSt 36-2
Weight: 1,6 gr / pc	
Parameter: Head length	Specification: double sided USL: 1,7 mm LSL: 1,5 mm Chart size: 25 Kind of chart: x-s Chart type: monitoring	

☒ Automatic sample range selection (select samples of the last control chart)
☐ Select sample range by beginning and closing time

Beginning time:
 Closing time:

Load data

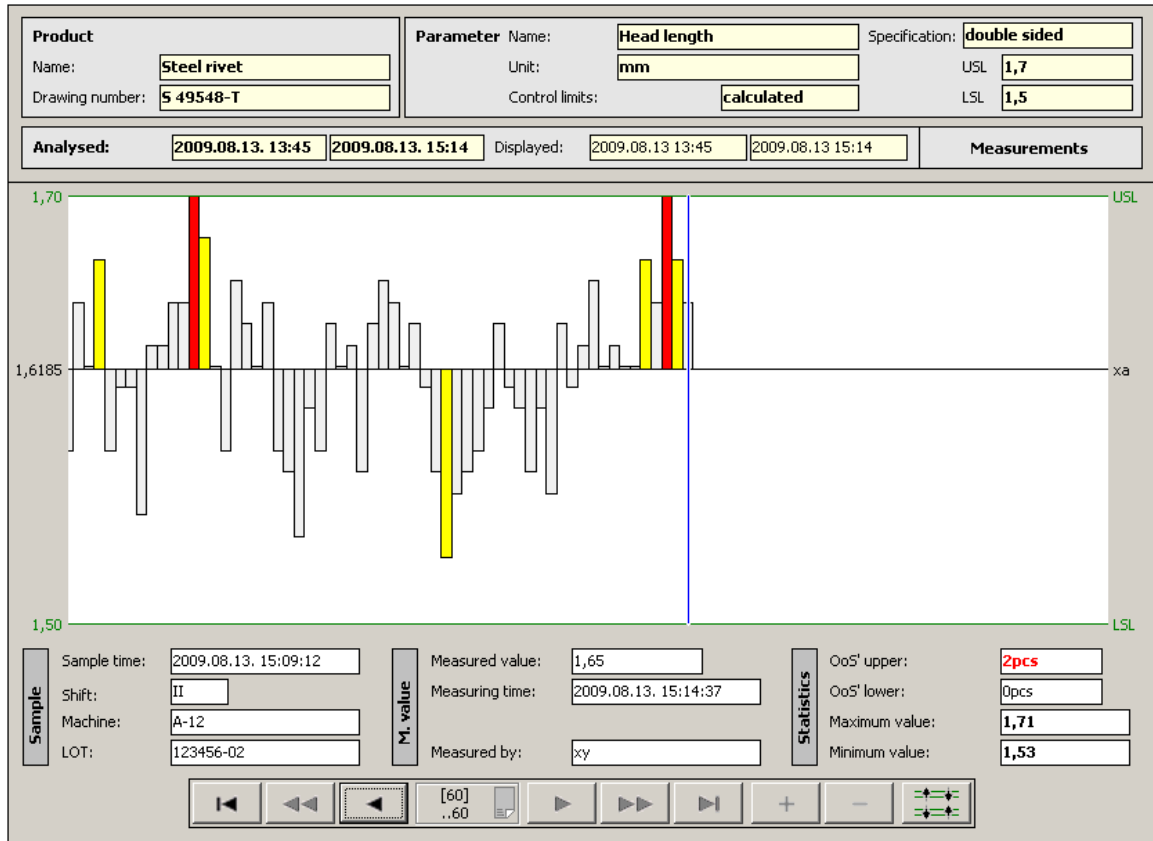
Filter options	Operator: xy	Shift: I II	Machine: A-11 A-12	LOT: 123456-00 123456-02 123456-04 123456-06 123456-07
----------------	--	---	--	--

If the data is loaded, number of samples and measured values will be displayed in the status row.

Loading is completed, number of samples: 12, number of measured values: 60.

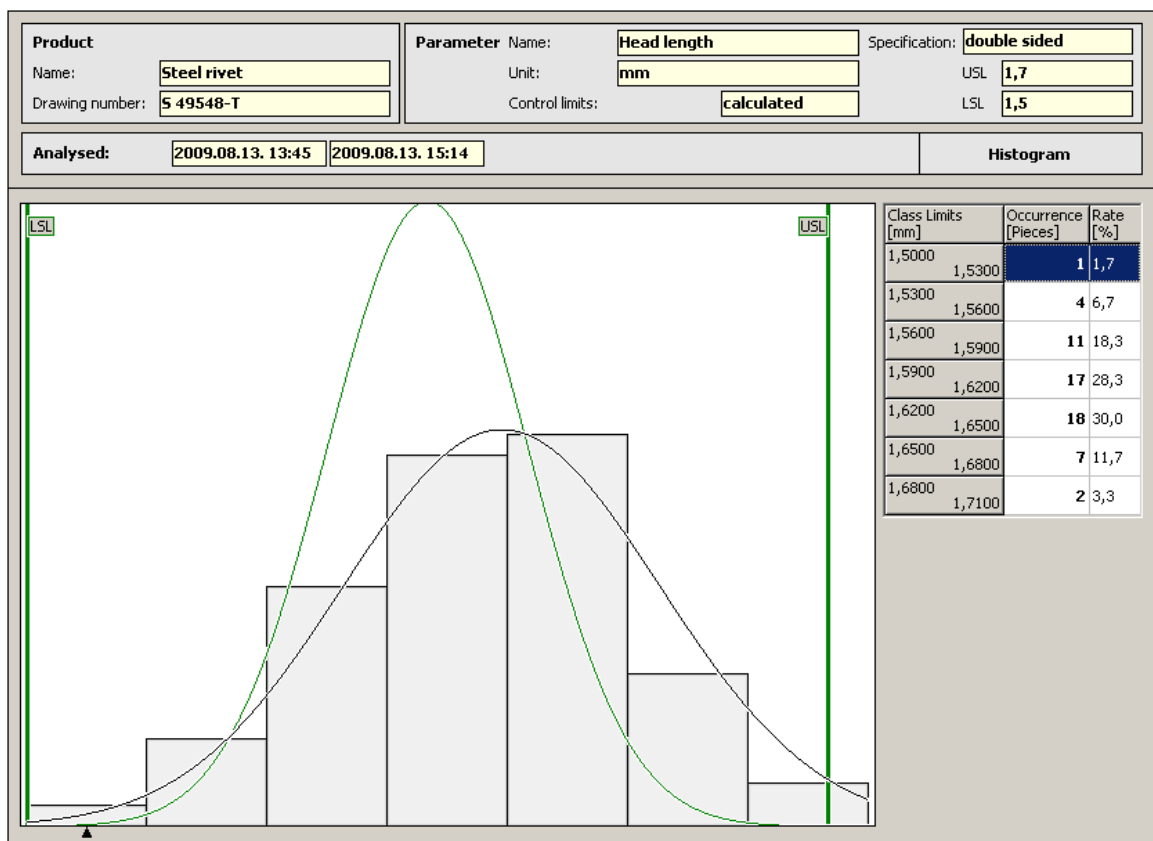
6.2 Value chart

Choose the **Value chart** menu item of the sub-menu after selecting the data.



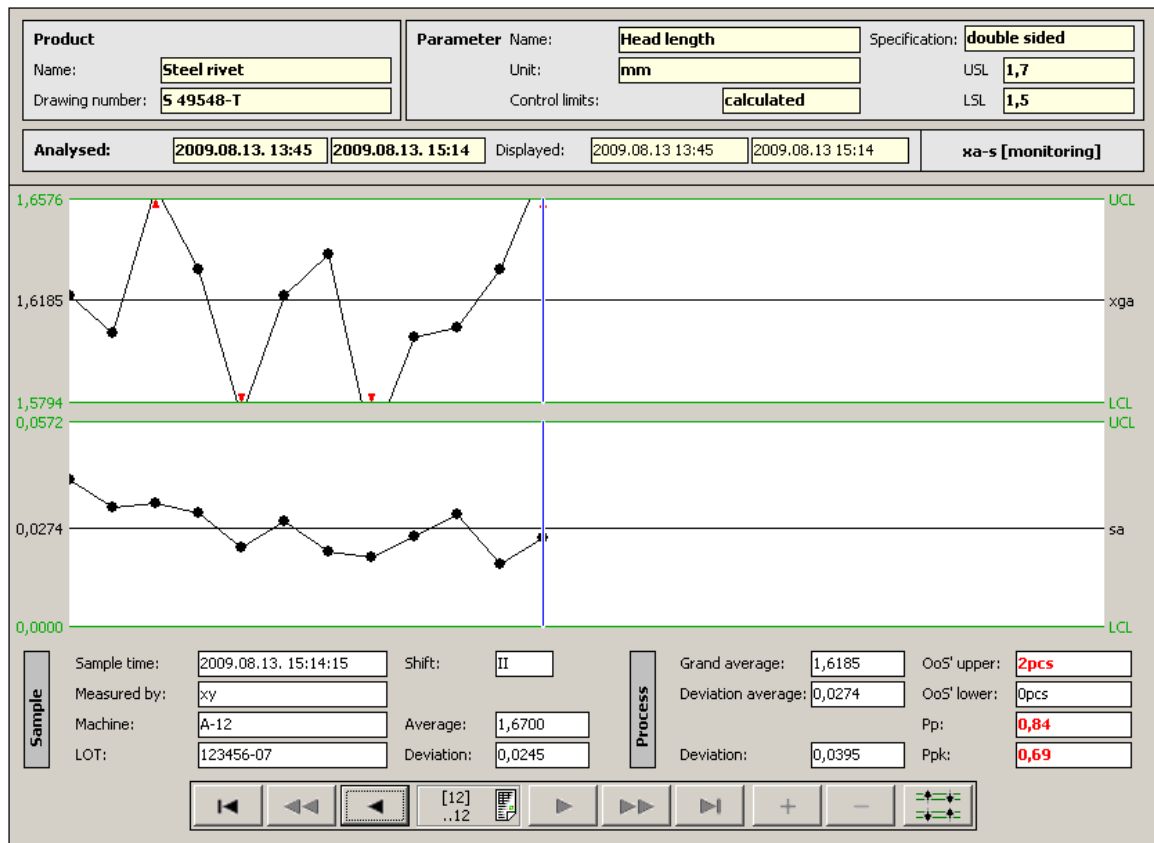
6.3 Histogram

Choose the **Histogram** menu item of the sub-menu after selecting the data.

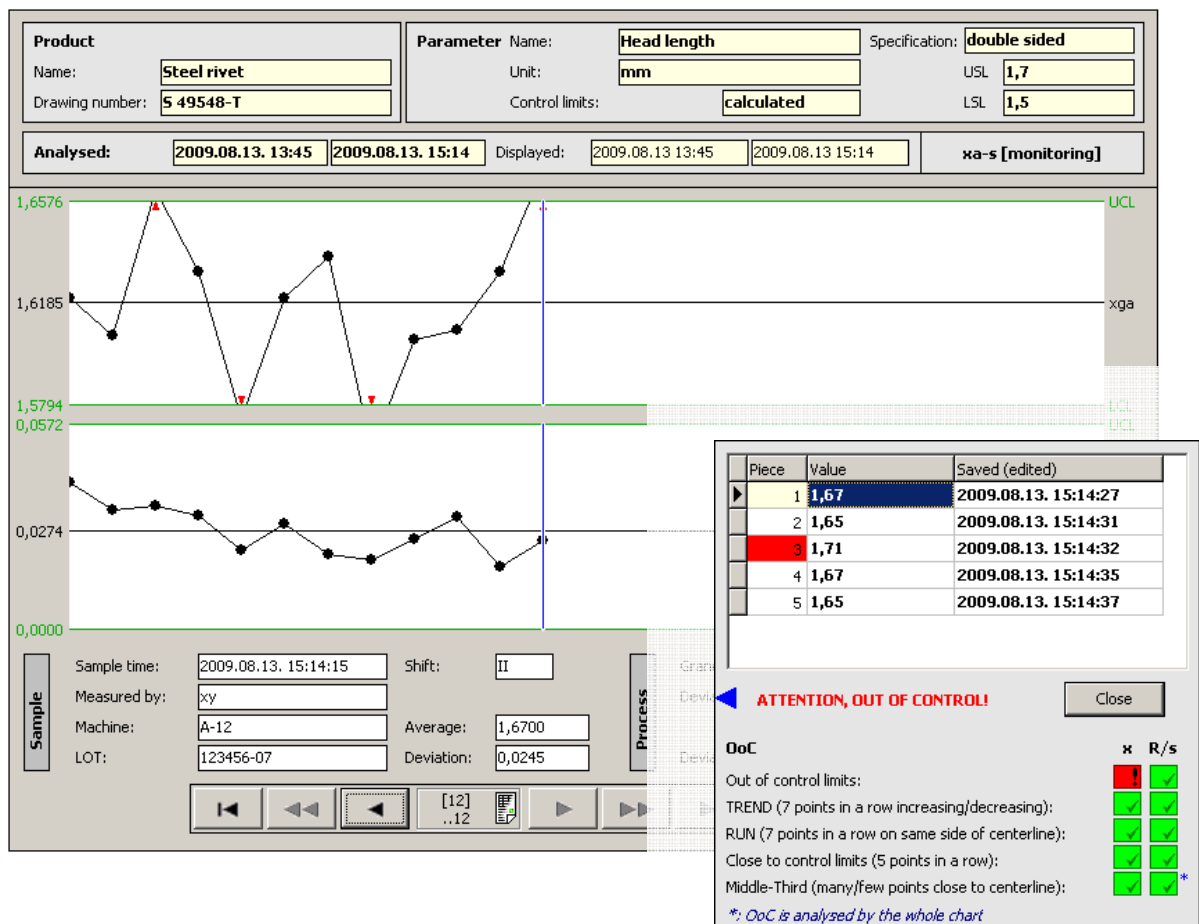


6.4 Control chart

Choose the **Control chart** menu item of the sub-menu after selecting the data.



It is possible to display the measured values of the appointed sample.



6.5 Process overview

Choose the **Overview** menu item of the main menu, and then the **Process states** menu item of the sub-menu.

Processes:

- Steel rivet
 - Head diameter
 - Head length
 - Stalk diameter
 - Total length

Unit:
Specification: **double sided**
USL LSL
Control chart: **xa-R** monitoring
Control limits: **calculated**
UCL, LCL (x)
UCL, LCL (R/s)

Data of last sample
Last sampling time:
Measured by:
Shift:
Machine:
LOT:
Sample average:
Sample range:
Sample deviation:
Sample OoC status: **OoC!**

Data of last control chart Time range: -
Maximum value: xa/xga
Minimum value: R/Ra:
OoS' upper: s/sa:
OoS' lower: Sigma (estimated deviation):
Process state: **NOT stable!**

Process capability data
Pp: Cp:
Ppk: Cpk:

6.6 Product pareto analysis

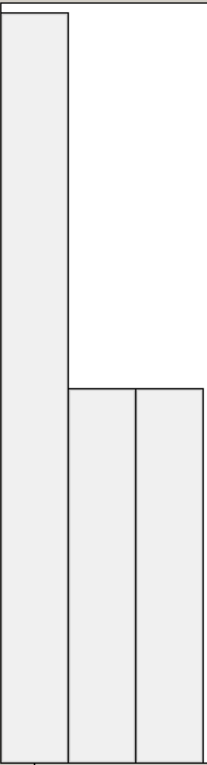
Choose the **Overview** menu item of the main menu, and then the **Product pareto** menu item of the sub-menu.

Product name
Steel rivet

Analysed: -
Refresh

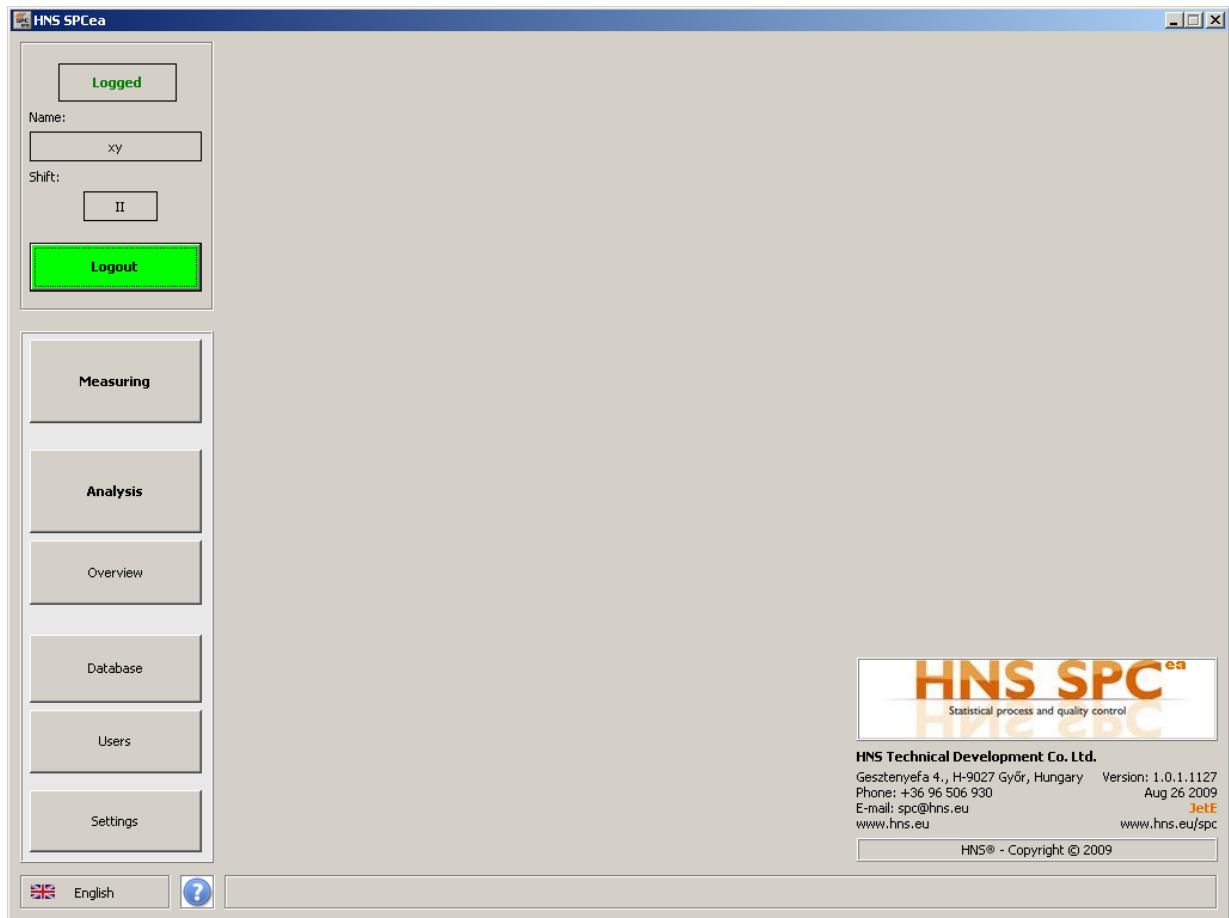
Parameter name	Defects
Head length	2
Head diameter	1
Total length	1

Measurements:
OoS' upper:
OoS' lower:



7 Exit from the program

Log out from the program with the **Logout** button.



The program can be closed by the usual way, by pressing the  button in the right-upper corner of the window (program can be closed at anytime, without logout).